IN THE SPECIFICATION:

Please amend the paragraph starting at page 3, line 25, as follows:

--In the case of Japanese Laid-open Patent Application 2001-117425 or 2001-117468, in order to extend the service life of the photoconductive drum of each process cartridge, the amount of the charge current to flow ~~be flowed~~ in the process cartridge is switched according to the properties of the cartridge and the information stored in the storage medium of the cartridge; the amount of the charge current is switched to the minimum value necessary to keep image quality at a preferable level. --

Please amend the paragraph starting at page 4, line 8, as follows:

--Incidentally, there are other methods for extending the service life of a photoconductive member. For example, a photoconductive member may increased in the thickness of its surface layer, which is reduced ~~reduces~~ at a constant rate, or a harder substance may be used as the material for the surface layer, while keeping the photoconductive drum the same in the thickness of the surface layer. --

Please amend the paragraph starting at page 4, line 27, as follows:

--However, in the case of the above described conventional method in which a harder substance is used as the means for extending the service life of a photoconductive drum, a new substance must be developed from scratch, and evaluated. Therefore, this method requires a substantial length of time. In addition, if a harder substance is used as the material for the surface layer of a photoconductive drum, the surface layer of the photoconductive drum is less likely to

be shaved away. Therefore, the unwanted substances, more specifically, the by-products of the electrical discharge resulting from the charging of the photoconductive drum, having adhered to the surface layer are less likely to be shaved away. As a result, a defective image, which is defective in that it appears unfocused like an image of a body of flowing water, is sometimes produced. In comparison, the method in which a photoconductive drum is simply increased in the thickness of its surface layer, in anticipation of the shaving, has the following problems. That is, if the thickness by which the surface layer is coated on a photoconductive layer exceeds a certain value, the ratio at which exposure light is transmitted ~~transmits~~ through the surface layer becomes insufficient; in other words, the photoconductive drum becomes inferior in sensitivity, more specifically, in dot reproducibility, failing thereby to reproduce a minute spot or the like, which in turn results in the formation of an image of lower quality. --

Please amend the paragraph starting at page 6, line 3, as follows:

--The method in which charge voltage is not applied during a sheet interval is definitely effective to reduce the wear on a photoconductive drum. However, it has the following problem. That is, while charge voltage is not applied, the portion of the peripheral surface of the photoconductive drum, which passes through the charging station while the charge voltage is not applied, is reduced ~~reduces~~ in potential level, becoming unstable in its potential level. As a result, developer (which hereinafter may be referred to as toner) of the normal type, or the reversal type, adheres to this portion of the peripheral surface of the photoconductive drum. Consequently, the interior of the image forming apparatus is soiled. Further, in the case of an image forming apparatus in which the transfer roller remains in contact with the peripheral surface of the

photoconductive drum, the transfer roller is soiled by the toner having adhered to the above described portion of the peripheral surface of the photoconductive drum, which corresponds to a sheet interval, and then, soils the following sheet of recording medium. --

Please amend the paragraph starting at page 8, line 7, as follows:

--the cartridge is provided with a storage medium having a first storage region for storing the information regarding the charge current to ~~be flowed~~ flow during a non-image formation period, and --

Please amend the paragraph starting at page 8, line 23, as follows:

--the storage medium has a first storage region for storing the information regarding the charge current to ~~be flowed~~ flow during a non-image formation period. --

Please amend the paragraph starting at page 9, line 5 as follows:

--it has a first storage region for storing the information regarding the charge current to ~~be flowed~~ flow during a non-image formation period. --

Please amend the paragraph starting at page 9, line 17, as follows:

--the storage medium has a first storage region for storing the information regarding the charge current to flow ~~be flowed~~ during a non-image formation period; and --

Please amend the paragraph starting at page 23, line 12, as follows:

--Thus, as the image forming apparatus is used, the photoconductive layer of the photoconductive drum 1 gradually is reduced ~~reduces~~ in thickness. As the thickness of the photoconductive layer of the photoconductive drum 1 is reduced ~~reduces~~ to a certain value (critical value: threshold value), the photoconductive layer becomes insufficient in photoconductivity. As a result, the photoconductive layer of the photoconductive drum 1 is reduced in charging retention capability. Consequently, it is improperly charged; for example, it becomes non-uniformly ~~nonuniformly~~ charged. Thus, the length of the service life of an image forming apparatus, and that of a process cartridge, can be defined as the number of prints which can be produced before the thickness of the photoconductive layer of the photoconductive drum 1 is reduced ~~reduces~~ below the critical value (threshold). --

Please amend the paragraph starting at page 26, line 27, as follows:

--Shown in FIG. 5 are the various data in the memory 22. There are stored various data in the memory 22. In this embodiment, the data to be stored in the memory are at least the data X, which is the value of the charge current to ~~be flowed~~ flow while an image is formed, and the data Y, which is the value of the charge current to ~~be flowed~~ flow while no image is formed. --

Please amend the paragraph starting at page 27, line 8, as follows:

--Here, the benefits of writing the information regarding the amount of the charge current to ~~be flowed~~ flow from the charge roller 2, into the memory 22 of the cartridge C will be described. --

Please amend the paragraph starting at page 30, line 7, as follows:

--A switching signal is transmitted to the charge bias power source 29, shown in FIG. 4, from the controlling portion proper 25, whereby the amount ~~by which the~~ of charge current ~~is flowed~~ that is flowing is changed. --

Please amend the paragraph starting at page 30, line 13, as follows:

--Next, referring to FIG. 7 which is a timing chart for the charge current switching sequence, the timing with which the amount by which the charge current (AC voltage in primary charge bias) ~~is flowed~~ flows is switched, and the value of the charge current, will be described. --

Please amend the paragraph starting at page 32, line 17, as follows:

--First, the timing with which the AC and DC (-) voltages of the primary charge bias, the AC and DC (-) voltages of the development bias, and the DC (+) voltage of the transfer bias, are applied, will be described. Further, the operational timing will be described by dividing the timing chart into five periods: (1)(2)(3)(4)(5), which can be classified into two groups: image formation periods ((2)(4)) and non-image formation periods ((1)(3)(5)). Here, the operational timings will be described in relation to the timing with which the AC voltage in the primary charge bias is applied. Thus, compared to the point in time at which the AC voltage of the charge bias is turned on in the periods (2) and (4), the point in time at which the AC voltage of the development bias is turned on, and the point in time at which the DC voltage of the transfer bias is turned on, are deviated to the right side, by the lengths which correspond to the order in which they act on the peripheral surface of the photoconductive drum; the later in the image formation

process, the further right in the timing chart. However, there ~~are~~ is virtually no difference among the lengths of time they are kept on, because they all must be kept on for the length of time necessary for image formation. --

Please amend the paragraph starting at page 34, line 23, as follows:

--Next, the bias application timing for the non-image formation periods will be described. The non-image formation period means the periods (1) (pre-rotation period), (3) (sheet interval period), and (5) (post-rotation period). The level l_{p0} at which the charge current ~~is flowed~~ flows during these periods is indicated by a bold line; such an AC voltage that causes a charge current of 1,400 μA to flow is applied as the AC voltage of the charge bias, so that during these periods, a smaller amount of charge current flows than during the image formation period. In other words, even during these periods, the charge bias is kept on, but such an AC voltage that causes a smaller amount (level l_{p0} in FIG. 7) of charge current than that which ~~is flowed~~ flows during the image formation period, to flow, is applied as the AC voltage of the charge bias; in the timing chart, the level at which the charge current ~~is flowed~~ flows during the non-image formation period is slightly lower than that during the image formation period. As will be evident from the above description, during the non-image formation periods which do not affect the quality ~~in~~ at which an image is outputted, it does not matter if certain points of the peripheral surface of the photoconductive drum are charged insufficiently enough to produce "sands". Therefore, the charge current level is set as described above. However, even during the non-image formation periods, it is desired that the potential level of the peripheral surface of the photoconductive drum will converge to the potential level equal to the potential level of the DC voltage applied at the

same time as the AC voltage, as long as an AC voltage is applied as a part of the charge bias. Therefore, of course, even during the non-image formation periods, the AC voltage applied as the AC voltage of the charge bias is such an AC voltage that is at least twice the starting voltage, in peak-to-peak voltage. --

Please amend the paragraph starting at page 43, line 2, as follows:

--In the first embodiment, the information regarding the properties of the charging means in a given process cartridge, and the amounts, by which charge current is to ~~be flowed~~ flow during an image formation period and a non-image formation period, are stored in the memory 22 of the given cartridge, and the information is transmitted to the main assembly of an image forming apparatus to make an image formation period different, in the amount by which the charge current flows ~~is flowed~~, from a non-image formation period, in order to reduce the amount by which the photoconductive drum is frictionally worn (shaved). This embodiment was proposed to further reduce the frictional wear of a photoconductive drum. --

Please amend the paragraph starting at page 43, line 16, as follows:

--The following are the results of the experiments carried out to study the relationship between the total amount of flowing charge current ~~flowed~~ to prevent the formation of the "sands", and the cumulative number of the prints. --

Please amend the paragraph starting at page 44, line 3, as follows:

--In the range A in the graph, a charge roller is the dominant factor in the formation of the "sands". That is, a charge roller 2 is contaminated with the external additives for toner, reversely charged toner, and paper dust, being thereby changed in charging performance. As a result, the amount by which the charge current flows is reduced ~~reduces~~. --

Please amend the paragraph starting at page 44, line 10, as follows:

--In the range B in the graph, a photoconductive drum is mainly responsible for the formation the "sands". That is, as a printing operation is repeated, the peripheral surface of the photoconductive drum is gradually shaved, reducing the photoconductive layer of the photoconductive drum in thickness. As the thickness of the photoconductive layer of the photoconductive drum is reduced ~~reduces~~, the impendence of the photoconductive drum is reduced ~~reduces in impedance~~, increasing thereby the voltage to be applied to charge the photoconductive drum. Therefore, it becomes easier for electrical discharge to occur, reducing thereby the amount of the charge current. --

Please amend the paragraph starting at page 45, line 27, as follows:

--(3) The amount of cumulative cartridge usage is calculated based on the cumulative length of time the charge bias has been applied, which was measured by the main assembly of an image forming apparatus 100, and the cumulative length of time the photoconductive drum 1 has been driven, which also is measured by the main assembly of the image forming apparatus, and if the value obtained by the calculation reaches the threshold stored in the memory, the amount of

the charge current is switched. With this arrangement, it is possible to properly charge a photoconductive drum by ~~flowing~~ causing the charge current to flow by the minimum amount necessary to maintain image quality at a preferable level, extending thereby the service life of the photoconductive drum. --

Please amend the paragraph starting at page 50, line 12, as follows:

--S106: The portion 27 for detecting the length of ~~in~~ time of the photoconductive member rotation begins to measure the length of ~~in~~ time of the photoconductive member rotation. --

Please amend the paragraph starting at page 50, line 16 as follows:

--S107: The portion 28 for detecting the length of ~~in~~ time of the charge bias application begins to measure the length ~~in~~ of time of the charge bias application. --

Please amend the paragraph starting at page 51, line 21 as follows:

--Incidentally, it is possible to reduce the storage capacity required of the memory 22, by storing in the memory 22 the coded charge current data, instead of a large volume of actual charge current data (charge current values themselves) regarding the minimum amount of the charge current for assuring that the charge current ~~flowed~~ flowing during an image formation period will not cause any image defect during an image formation period, while minimizing the frictional wear of a photoconductive drum. --

Please amend the paragraph starting at page 52, line 6 as follows:

--As described above, in this embodiment, the AC voltage applied as a part of charge bias is controlled in accordance with the above described flowchart so that the charge current value will follow the solid line in FIG. 12, making it possible to charge a photoconductive drum by causing to flow ~~flowing~~ the minimum amount of charge current necessary to maintain image quality at a preferable level. Therefore, it is possible to extend the service life of a photoconductive drum while maintaining image quality at a preferable level. According to one of the tests, a photoconductive drum of a certain type, the service life of which in terms of print count was estimated to be 15,000, could produce 20,000 prints, proving the effectiveness of the present invention. --

Please amend the paragraph starting at page 52, line 21 as follows:

--In this embodiment, the amount of the charge current is switched only once. However, it may be switched multiple times, that is, in steps, in accordance with the properties of each charge roller. Further, the amount by which the charge current ~~is flowed~~ flows may be raised or lowered depending on the condition of each cartridge. Further, in this embodiment, only one threshold is provided for the drum usage data. However, multiple thresholds may be provided. --

Please amend the paragraph starting at page 53, line 4 as follows:

--When multiple thresholds are provided for the drum usage data obtained with the use of the arithmetic formulae, the number of the thresholds ($\alpha 1$, $\alpha 2 \ldots . \alpha n$) stored in the memory 22 is to made to match the number of the charge current values ~~to~~ by which the ~~mount~~ amount of the

charge current is switched. In such a case, the number of the charge current values X for an image formation period, and the number of the charge current values Y for a non-image formation period, which are stored in the memory 22, are to be greater by one than the number of the thresholds a stored in the memory 22. The memory 22 and the main assembly of an image forming apparatus are set up so that these data are transmittable between the memory 22 and the arithmetic portion 26 of the control portion 24 of the main assembly. Calculation is made based on these data, and the data obtained by the calculation is referenced by the controlling portion proper 25. --

Please amend the paragraph starting at page 54, line 15 as follows:

--As described above, according to this embodiment, the amount by which the charge current ~~is flowed~~ flows is switched between an image formation period and a non-image formation period, in accordance with the condition of a process cartridge (cumulative amount of drum usage) so that the minimum amount of charge current necessary to keep image quality at a preferable level is flowed. Therefore, it is possible to extend the service life of a photoconductive drum, in other words, the service life of a process cartridge, while keeping image quality at a preferable level. --

Please amend the paragraph starting at page 55, line 18 as follows:

--Also according to this embodiment of the present invention, it is possible to provide a storage medium (memory) mountable in a process cartridge to store the information regarding the

amount by which charge current is to flow ~~be flowed~~, and capable of transmitting the information therein to the main assembly of an image forming apparatus. --

Please amend the paragraph starting at page 56, line 6 as follows:

--More specifically, a controlling means is provided for changing the amount, by which the charge current is to flow ~~be flowed~~, between an image formation period and a period other than an image formation period, based on the information stored in the storage medium (memory) of a process cartridge, making it possible to set the amounts, by which charge current is to flow ~~be flowed~~ during an image formation period and a non-image formation period, to the minimum values necessary to keep image quality at a preferable level, in accordance with the information regarding the cartridge properties, that is, the properties of the charging means in the cartridge. Therefore, it is possible to always form an excellent image while minimizing the frictional wear (shaving) of the photoconductive member. In other words, it is possible to extend the service life of a photoconductive member without changing the material for a photoconductive drum, and the thickness of the photoconductive layer of the photoconductive drum. This means that according to the embodiments of the present invention, a photoconductive member can be reduced in the thickness of its photoconductive layer, while providing the photoconductive member with the same specifications (service life of same length) as those of a photoconductive member in accordance with the conventional arts, making it possible to not only reduce the cost of a photoconductive drum, but also, to form a sharper latent image which effects a better image than an image formed with the use of a photoconductive member in accordance with the conventional arts. --

Please amend the paragraph starting at page 57, line 11 as follows:

--In the above described embodiments, the information to be stored in the memory of a cartridge was the values for the charge current to ~~be flowed~~ flow during an image formation period and a non-image formation period. However, the information to be stored in the memory does not need to be limited to the above described one. For example, the values for the charge voltage instead of the values for the charge current may be stored, which is obvious. --